

## **REMARKS**

### **1. Status of Claims**

Claims 1-58 are pending in this application and have been rejected. Applicant has amended claim 1 to insert two commas, in order to make the claim easier to read. Applicant has amended claims 4 and 58 to change “the azeotroping agent” to “the at least one azeotroping agent,” as suggested by the Examiner. Applicant has also rewritten claims 11, 15, 27, and 49 in independent form, including the limitations of all claims from which they originally depended. Claim 53 has been amended to correct a minor typographical error. No new matter has been added by any of these amendments.

### **2. Allowability of Claims 11-12, 15-18, 27-29, and 49-57**

In the office action dated September 28, 2004, the Examiner indicated that claims 11-12, 15-18, 27-29, and 49-57 would be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claim. Applicant has amended these claims as suggested by the Examiner, and therefore these claims should be in condition for allowance.

### **3. Objections to the Claims**

The Examiner objected to the phrase “the azeotroping agent” in claim 4 as being inconsistent with “the at least one azeotroping agent” in claim 1. Although applicant does not believe there is any inconsistency, claim 4 has been amended to match the exact phrase quoted from claim 1. The same amendment has been made to claim 58.

The Examiner also objected to claim 49 as being at odds with claim 1, from which it depended. Claim 49, prior to the amendment, stated that the feed stream comprised an extract of a fermentation broth. Claim 1 states that the feed stream comprises at least one of an organic acid ammonium salt, an organic acid amide, or a alkylamine-organic acid complex. Thus, claim

49 covered a version of the process of claim 1 in which the feed stream comprised an extract of a fermentation broth, and the feed stream also comprised at least one of an organic acid ammonium salt, an organic acid amide, or a alkylamine-organic acid complex. There was nothing inconsistent between these claim elements.

Claim 49 has now been rewritten in independent form, and states that the feed stream comprises an extract of a fermentation broth that comprises at least one of an organic acid ammonium salt, an organic acid amide, or a alkylamine-organic acid complex. There is no inconsistency in this claim language, and the objection to claim 49 should be withdrawn.

#### **4. Rejections under 35 U.S.C. § 112, Second Paragraph**

The Examiner rejected claims 1-58 as being indefinite on a number of grounds, referring to pages 2-3 of the previous office action (which was dated April 6, 2004). The following lettered paragraphs correspond to the letters on those pages of the previous office action.

(A) The Examiner stated that the phrase “heating at least one of the feed stream, the at least one azeotroping agent, or the mixture thereof” in claim 1 was ambiguous because the claim initially recited mixing the feed stream and the azeotroping agent. There is no ambiguity in this language. The claim makes clear that the mixture comprising the at least one azeotroping agent and the feed stream is distilled by a method that comprises heating at least one of (1) the feed stream, (2) the at least one azeotroping agent, or (3) the mixture thereof. Stated another way, the heating can be done (1) to the feed stream prior to its mixing with the at least one azeotroping agent, (2) to the at least one azeotroping agent prior to its mixing with the feed stream, (3) to the mixed feed and azeotroping agent after they are mixed, or (4) some combination of these approaches. The claim is clear and the rejection should be withdrawn.

In this same paragraph, the Examiner also argued that claim 1 was incomplete “without the process connection between the mixing and the heating step.” The Examiner apparently contends that the use of the term “distilling” in the claim without also reciting in the claim evaporation, vaporization or boiling, and condensation, renders the claim indefinite. The Examiner argues that the claim as written covers other heating operations, such as evaporation or heat exchange, which are distinct from distillation.

Section 112, second paragraph, requires that the claims, when read in light of the specification, reasonably apprise a person skilled in the art of the scope of the invention. *Utah Medical Products, Inc. v. Graphic Controls Corp.*, 350 F.3d 1376, 69 U.S.P.Q.2d 1136, 1139 (Fed. Cir. 2003). If a person of ordinary skill in the art would understand the claim, then § 112, second paragraph, is satisfied. *In re Oetiker*, 23 U.S.P.Q.2d 1661, 1662 (Fed. Cir. 1991). In this case, “distilling” is a very well-known term which would be easily understood by a person of ordinary skill in the relevant art. There is no ambiguity or vagueness, and no basis for an indefiniteness rejection.

The Examiner’s comments seem to imply a requirement that the claim explicitly recite every feature of each claim element as it would be practiced in the real world. For example, if a distillation operation would typically include condensation of an overhead stream, the Examiner seems to imply that condensation would therefore need to be explicitly recited in the claim in order to satisfy § 112, second paragraph. This is clearly incorrect as a matter of law. There is no support for this in either the statute or the case law. “A claim is not defective when it states fewer than all of the steps that may be performed in practice of an invention.” *Smith & Nephew, Inc. v. Ethicon, Inc.*, 276 F.3d 1304, 1311, 61 U.S.P.Q.2d 1065 (Fed. Cir. 2001).

The indefiniteness rejections of claim 1 are improper and should be withdrawn.

(B) The Examiner stated that an azeotrope is normally defined by its pressure and composition, but those parameters are not specified in the claims. The Examiner apparently contends that the claims must recite a specific pressure and exact weight percentages for each component of the azeotrope. With all due respect, there is absolutely no legal basis for this contention. As stated above, § 112, second paragraph, requires that the claims, when read in light of the specification, reasonably apprise a person skilled in the art of the scope of the invention. If a person of ordinary skill in the art would understand the claim, then § 112, second paragraph, is satisfied. In this case, the term “azeotrope” has a well-understood meaning in the relevant art. There is absolutely no basis for the Examiner to say that this term is indefinite. Further, the idea that the claim must recite specific weight percentages for each component of the azeotrope and must also recite a specific pressure is absolutely without legal basis. This rejection should be withdrawn.

(C) The Examiner stated that the claims were inconsistent in sometimes using the phrase “the azeotroping agent” and other times using “the at least one azeotroping agent.” Applicant has amended the claims to consistently use the latter phrase, and therefore the basis for this rejection is removed.

(D) In the office action of April 6, 2004, the Examiner raised an issue regarding claim 11. However, since the Examiner indicated in the office action of September 28, 2004 that claim 11 would be allowable if rewritten into independent form, applicant understands that the § 112 rejection of claim 11 has been withdrawn.

(E) The Examiner stated that in claim 1 the phrase “at least one first azeotrope comprising the organic acid and the at least one azeotroping agent” lacks proper antecedent

support when the feed stream is the one heated. Applicant does not understand this rejection.

The phrase quoted by the Examiner is part of the following longer passage:

distilling the feed stream by a method comprising the steps of

(i) heating at least one of the feed stream, the at least one azeotroping agent, or the mixture thereof, thereby (a) decomposing the ammonium salt, the amide, or the alkylamine-organic acid complex to produce organic acid, and (b) producing a first vapor stream that comprises at least one first azeotrope comprising the organic acid and the at least one azeotroping agent . . .

Since step (b) introduces the term “a first vapor stream that comprises at least one first azeotrope comprising the organic acid and the at least one azeotroping agent” as being produced in that step, there can be no question of antecedent basis. Applicant submits that this rejection has no proper basis and should be withdrawn.

(F) The Examiner stated that in claim 8, applicant should change “comprises” to “further comprises.” This amendment has already been made by applicant in the response filed on May 6, 2004. Applicant assumes that it was an inadvertent error by the Examiner to include this rejection by reference in the September 28, 2004 office action.

(G) The Examiner stated that claim 11 should recite a first bottoms stream in addition to the second bottoms stream. At the time of the office actions, claim 11 depended on claim 10, which recites a first bottoms stream. Therefore, this rejection of claim 11 was not proper. Claim 11 has now been rewritten into independent form as suggested by the Examiner elsewhere in the September 28, 2004 office action, and explicitly recites both a first bottoms stream and a second bottoms stream. This rejection should be withdrawn.

(H) The Examiner stated that “fermentation broth” in claim 25 was at odds with “feed stream” in claim 1, the claim from which claim 25 depends. This is clearly incorrect. Claim 1 states that “the feed stream comprises at least one of an organic acid ammonium salt, an organic acid amide, or a alkylamine-organic acid complex . . .” Claim 25 states that “the feed stream

comprises a fermentation broth, wherein the fermentation broth comprises the organic acid ammonium salt, the organic acid amide, or the alkylamine-organic acid complex.” This is completely clear. There is no proper basis for a § 112 rejection of claim 25, and the rejection should be withdrawn.

#### **5. Objection to the Specification**

The Examiner objected to the specification as failing to provide proper antecedent basis for the phrase “wherein the feed stream comprises a fermentation broth, wherein the fermentation broth comprises the organic acid ammonium salt, the organic acid amide, or the alkylamine-organic acid complex” in claim 25. This is supported in the specification at page 11, lines 7-12. The objection should be withdrawn.

#### **6. Double Patenting**

The Examiner provisionally rejected claims 1-58 for double patenting over claims 1-54 and 1-64 in copending applications 09/809,534 and 09/809,649, respectively. The claims in the two copending applications have not yet been patented yet, so this is only a provisional rejection.

A “same invention” double patenting rejection (as opposed to an “obviousness-type” double patenting rejection) is proper only when the two claimed inventions are identical in scope. *In re Goodman*, 11 F.3d 1046, 29 U.S.P.Q.2d 2010, 2015 (Fed. Cir. 1993); *In re Vogel*, 422 F.2d 438, 164 U.S.P.Q. 619, 621-622 (C.C.P.A. 1970). That is clearly not true in this case. The claims pending in the other two applications contain limitations that are different from those in the claims in this application.

For instance, claim 1 in application 09/809,534 states that “a first vapor stream” is produced that comprises “at least one azeotrope comprising the cyclic ester of the hydroxyl

organic acid . . . .” The claims in the present application do not recite a cyclic ester of a hydroxyl organic acid.

As another example, independent claim 4 of application 09/809,648 contains the following language:

distilling the mixture comprising the at least one azeotroping agent and the feed stream by a method comprising the steps of

(i) heating the mixture, wherein the heating is sufficient to produce a first vapor stream that comprises water and at least one first heteroazeotrope comprising (a) the organic acid or the organic acid amide and (b) the at least one azeotroping agent; and

(ii) separating the first vapor stream from the mixture and producing a first bottoms stream, wherein the first bottoms stream comprises at least some of the organic acid or the organic acid amide, wherein the first bottoms stream is capable of being separated into a first phase and a second phase, wherein the first phase comprises a higher concentration of the organic acid or the organic acid amide than the second phase, and wherein the second phase comprises the at least one azeotroping agent;

separating the first bottoms stream into a first phase and a second phase;

condensing the first vapor stream to produce a first liquid stream;

distilling the first liquid stream by a method comprising the steps of

(A) adjusting the temperature of the first liquid stream to a temperature sufficient to produce a second vapor stream that comprises an azeotrope that comprises water and the at least one azeotroping agent and a second bottoms stream;

(B) separating the second vapor stream from the second bottoms stream, wherein the second bottoms stream comprises at least some of the organic acid or the organic acid amide

This language is quite different from the claims in the present application.

There is no reasonable basis for the Examiner to say that the claims in this application are identical in scope to those in either application 09/809,534 or application 09/809,649. The double patenting rejection is plainly inappropriate and should be withdrawn.

## **7. Obviousness-Type Double Patenting**

The Examiner provisionally rejected claims 1-58 for obviousness-type double patenting over claims 1-54 and 1-64 in copending applications 09/809,534 and 09/809,649, respectively. The claims in the two copending applications have not yet been patented yet, so this is only a provisional rejection.

A claim can be rejected for obviousness-type double patenting “when the claimed subject matter is not patentably distinct from the subject matter claimed in a commonly owned patent.” *In re Berg*, 46 U.S.P.Q.2d 1226, 1229 (Fed. Cir. 1998). “Generally a ‘one-way’ test has been applied to determine obviousness-type double patenting. Under that test, the examiner asks whether the application claims are obvious over the patent claims.” *Id.*

In this case, the claims of the present application are not so similar to those in the two copending applications that they are patentably indistinct from each other. As outlined above, there are significant differences in claim elements in the different applications. The Examiner has provided no factual reasoning or explanation as to how the claims of this application would be rendered obvious by those in the copending applications.

The obviousness-type double patenting rejection is not proper and should be withdrawn.

## **8. Rejections under 35 U.S.C. § 103(a)**

The Examiner rejected claims 1-10, 19-26, 30-48, and 50 under 35 U.S.C. § 103(a) as being unpatentable over Baker U.S. Patent 4,191,616. Baker describes a process for purifying dicarboxylic acids, especially mixtures of such acids. (Column 1, lines 4-6.) Baker explains that adipic acid can be manufactured by the oxidation of a feedstock such as cyclohexane. (Column 1, lines 27-35.) Mixed carboxylic acids result as by-products in such oxidations. Adipic acid crystallizes from the reaction mixture on cooling, leaving a mother liquor which is recycled after



adding nitric acid. From time to time, a purge stream must be withdrawn to control the impurity level. (Column 1, lines 39-50.) “Apart from nitric acid, catalyst and residual adipic acid, the principal constituents of the purge are succinic acid and glutaric acid.” (Column 1, lines 50-52.) In the process taught by Baker, purge waste is co-distilled with an alkylbenzene to obtain a purified mixture of adipic, glutaric, and succinic acids, or by the use of fractionation, separated acids can be obtained. (Column 2, lines 32-38.)

In claim 1 of the present application, a feed stream is used that comprises at least one of an organic acid ammonium salt, an organic acid amide, or an alkylamine-organic acid complex. Baker does not disclose any of these three types of compounds. Claim 1 also involves heating at least one of the feed stream, the at least one azeotroping agent, or the mixture thereof, thereby decomposing the ammonium salt, the amide, or the alkylamine-organic acid complex to produce organic acid. Since Baker does not disclose an organic acid ammonium salt, an organic acid amide, or an alkylamine-organic acid complex, Baker does not teach the decomposition of such a compound under heating either.

Baker’s failure to teach or suggest these elements of claim 1 shows that the claim is nonobvious. All of the other independent claims in this application contain identical or very similar limitations. Thus, all of the pending claims either recite these limitations or depend on other claims that do so.

The Examiner rejected claims 13-14 under § 103(a) as being unpatentable over Baker ‘161 in view of Othmer U.S. Patent 2,050,234. Othmer is apparently cited regarding the separation of a liquid stream into a first phase and a second phase. However, since neither Othmer nor Baker teach (1) the use of a feed stream that comprises at least one of an organic acid ammonium salt, an organic acid amide, or an alkylamine-organic acid complex, or (2)

heating at least one of the feed stream, the at least one azeotroping agent, or the mixture thereof, thereby decomposing the ammonium salt, the amide, or the alkylamine-organic acid complex to produce organic acid, the references cannot render claim 1 obvious. As mentioned above, each pending claim either contains such limitations or else depends on another claim that does so.

Therefore, the § 103(a) rejections should be withdrawn.

**9. Forms PTO-1449**

Attached to this response are three pages of forms PTO-1449 that applicant submitted with Information Disclosure Statements on May 10, 2001 and August 15, 2003, but which have not yet been initialed by the Examiner. Applicant requests that the Examiner initial each reference listed on these forms and attach the initialed forms to the next office action, to confirm that the references have been considered.

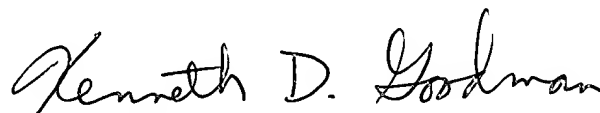
**10. Conclusion**

Claims 1-58 should now be in condition for allowance. Please contact the undersigned attorney at (713) 934-4094 if there are any questions.

Respectfully submitted,

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